Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

USDA FOREST SERVICE
RESOURCE BULLETIN NC-16
1972

aSD11
A35
no.2

Missouri's Primary Forest Products Output and Industries 1969

JAMES E. BLYTH and ROBERT MASSENGALE

FOREST SERVICE • U.S. DEPARTMENT OF AGRICULTURE
NORTH CENTRAL FOREST EXPERIMENT STATION

CONTENTS

Forest Industry Trends and Highlights 1

Forest Industry Overview 1

Sawmill Industry 2

Cooperage Industry 5

Charcoal Industry 7

Pulpmill Industry 9

Other Timber Industries 10

Primary Plant Residue 12

COVER PHOTOS courtesy of Missouri Conservation Department.

THE AUTHORS: James E. Blyth is a Market Analyst for the Station's Headquarters Laboratory in St. Paul, Minnesota. Robert Massengale is a Forest Products Specialist for the Missouri Conservation Department.

North Central Forest Experiment Station
John H. Ohman, Director
Forest Service – U.S. Department of Agriculture
Folwell Avenue
St. Paul, Minnesota 55101

(Maintained in cooperation with the University of Minnesota)

Blyth, James E., and Robert Massengale.
1972. Missouri's primary forest products output and industries, 1969. North Cent. For. Exp. Stn., St. Paul, Minn. 15 p., illus. (USDA For. Serv. Resour. Bull. NC-16)

Missouri roundwood production was 123.5 million cubic feet in 1969 – 96 percent hardwoods and 4 percent softwoods. Of this total, over half was saw logs, one-eighth was charcoal wood, and 7 percent was cooperage logs. Most logging is centered in and adjacent to the Eastern Ozark Region.

OXFORD: 792:791:796.4(778). KEY WORDS: saw logs, cooperage logs charcoal wood, pulpwood, residue, markets.

Blyth, James E., and Robert Massengale.
1972. Missouri's primary forest products output and industries, 1969. North Cent. For. Exp. Stn., St. Paul, Minn. 15 p., illus. (USDA For. Serv. Resour. Bull. NC-16)

Missouri roundwood production was 123.5 million cubic feet in 1969 – 96 percent hardwoods and 4 percent softwoods. Of this total, over half was saw logs, one-eighth was charcoal wood, and 7 percent was cooperage logs. Most logging is centered in and adjacent to the Eastern Ozark Region.

OXFORD: 792:791:796.4(778). KEY WORDS: saw logs, cooperage logs, charcoal wood, pulpwood, residue, markets.

MISSOURI'S PRIMARY FOREST PRODUCTS OUTPUT AND INDUSTRIES, 1969

James E. Blyth and Robert Massengale

FOREWORD

Information in this report came from a cooperative study by the North Central Forest Experiment Station and the Missouri Conservation Department (MCD). Except for pulpmills and noncommercial sawmills,[1] all Missouri primary wood-using firms were personally canvassed by MCD District Foresters and Farm Foresters. These foresters estimated the log receipts by species and county of origin at noncommercial sawmills. Less than 3 percent of Missouri's saw log receipts went to noncommercial mills in 1969.

Pulpmills using Missouri wood were canvassed by mail questionnaire as part of the Station's annual pulpwood survey. The Station sent questionnaires to all out-of-State mills using Missouri logs and bolts and followed up with phone calls to nonrespondents. Railroads operating in Missouri sent the Station data on the volume of logs loaded on cars in Missouri destined for seaports.

Estimates of fuelwood and post production were made from the latest Census of Housing and Census of Agriculture data and from information on plant residue disposal furnished on the primary[2] mill questionnaires.

The Station edited and compiled the data.

FOREST INDUSTRY TRENDS AND HIGHLIGHTS

- Markets for saw logs, pulpwood, charcoal wood and poles are expected to continue to expand during the next decade. The largest percentage gain will probably be in pulpwood production.

- Veneer log and cooperage markets will be uncertain during the 1970's and will be greatly influenced by consumer tastes and preferences. Wide swings in production may occur.

- Use of plant residue for pulping has been growing rapidly, but 100,000 cords of coarse (chippable) plant residue and 138,000 cords of fine plant residue were not used in 1969. Efforts should be directed toward finding new commercial uses (such as livestock feed) and continuing expansion of existing pulpwood and charcoal outlets for this material.

- Active primary mills are declining in number, but the quantity of wood used per mill is rising. This trend is likely to continue.

- Roundwood production is highest in the Eastern Ozarks and neighboring counties where forest industry is centered. Missouri forests supply nearly all the raw material needs of the primary forest industries.

- Missouri leads all other States in charcoal and cooperage production.

- Missouri harvests more redcedar than any other State and is one of the three leading producers of walnut logs and bolts.

FOREST INDUSTRY OVERVIEW

The timber-based industries are an important component of Missouri's rural economy. According to the 1967 Census of Manufactures, these industries (SIC 24 – Lumber and Wood Products, and SIC 26 – Paper and Allied Products) accounted for the following percentages of all Missouri manufacturing activities:

	Percent
Employment	4.3
Payroll	3.4
Production man-hours	5.0
Wages	4.0
Value added in manufacturing	3.5
Value of shipments	3.1
Capital expenditures (new)	4.1

Many of the 19,300 employed in the wood-based industries are in small towns and rural areas where other types of industrial employment opportunities are scarce.

[1] *Sawmills producing less than 100,000 board feet annually.*

[2] *Mills using logs and bolts or chips, shavings, etc., from logs and bolts.*

Missouri has three major primary wood-using industries – sawmill, charcoal, and cooperage. All but 132 of the 681 primary mills operating in 1969 were sawmills; the remainder included 52 charcoal plants and 36 cooperage mills (table 1). These active mills are only 59 percent of the number operating in 1958 and less than one-fourth the number in 1946. However, the average mill size, in terms of log volume consumed annually, has increased significantly during the last quarter century.

Table 1. – Number of active, primary, wood-using plants in Missouri, 1946, 1958, and 1969

Kind of plant	1946	1958	1969
Sawmills:			
Large[1/]	2	5	7
Medium[2/]	43	103	117
Small[3/]	2,548	882	425
Total	2,593	990	549
Cooperage mills	85	36	36
Veneer mills:			
Face, core and specialty	1	1	2
Container	5	2	2
Total	6	3	4
Pulpmills	--	2	2
Charcoal	3	60	52
Handle	19	12	7
Treating plants	6	14	22
Miscellaneous[4/]	94	44	9
Grand total	2,806	1,161	681

1/ Annual lumber production of 5 million board feet or more.
2/ Annual lumber production of 1.000 to 4.999 million board feet.
3/ Annual lumber production less than 1 million board feet.
4/ Includes excelsior mills, novelty plants, shaving mills, etc.

Primary mills and roundwood product output are concentrated in the Eastern Ozark Region and bordering counties (figs. 1 and 2). Although some counties have no primary mills, every county contributed some industrial roundwood[3] in 1969.

Missouri roundwood production was 123.5 million cubic feet in 1969 – 96 percent hardwoods and 4 percent softwoods (table 2). Of this total, over half was saw logs, one-eighth was charcoal wood, and nearly one-tenth was cooperage logs. Softwood harvesting (primarily saw logs and posts) dropped sharply from 1946 to 1958 (table 3). Since then the softwood harvest has leveled off. Hardwood harvests declined moderately from 1946 to 1969, mainly because the demand for saw logs fell during the first half of this period and use of fuelwood and posts was down during the last half when saw log demand recovered.

Principal species cut are white, red, and black oaks. Other important species cut are hickory, cottonwood, shortleaf pine, sycamore, and walnut (table 4). Although most logging is centered in and adjacent to the Eastern Ozark Region, about half of the walnut is cut in the Northern Prairie Region.

Estimated value of Missouri's 1969 timber harvest was 33.1 million dollars.[4] Saw logs accounted for almost 18 million dollars. Much of this money remains to aid the local economy of rural areas where the logging was done.

Farm and other nonindustrial private landowners are the chief suppliers of wood (table 5). However, National Forests furnished nearly one-third of the softwood saw logs and posts in 1969 and nearly one-tenth of the hardwood saw logs.

SAWMILL INDUSTRY

Missouri cut 368 million board feet of lumber at 549 sawmills in 1969. Nearly half was sawn in the Eastern Ozarks and over one-fifth in the Southwest Ozarks (table 6). Lumber output was greatest in Wayne, Texas, Reynolds, and Howell Counties.

During the last century, lumber production has been the backbone of Missouri's primary timber industry. In 1869 lumber production was 330 million board feet and peaked at 724 million at the turn of the centruy (fig. 3). Even during the depression in the 1930's, lumber output never fell below 140 million board feet. A modern day high (525 million board feet) occurred in 1946, followed by a steep drop to 153 million board feet in 1951 and a moderate recovery since then.

While the Missouri active sawmill population fell more than 2,000 from 1946 to 1969, average annual lumber output per mill climbed from 200 to 670 thousand board feet. During this period, the number of mills sawing 1 million board feet or more annually climbed from 45 to 124, but the number sawing smaller amounts fell markedly. Fifty-two mills cut nearly half of Missouri's lumber in 1969 while over six times as many mills cut only 13 percent (fig. 4).

[3] *Industrial roundwood includes all logs and bolts except fuelwood.*

[4] *F.o.b. mill or local delivery point.*

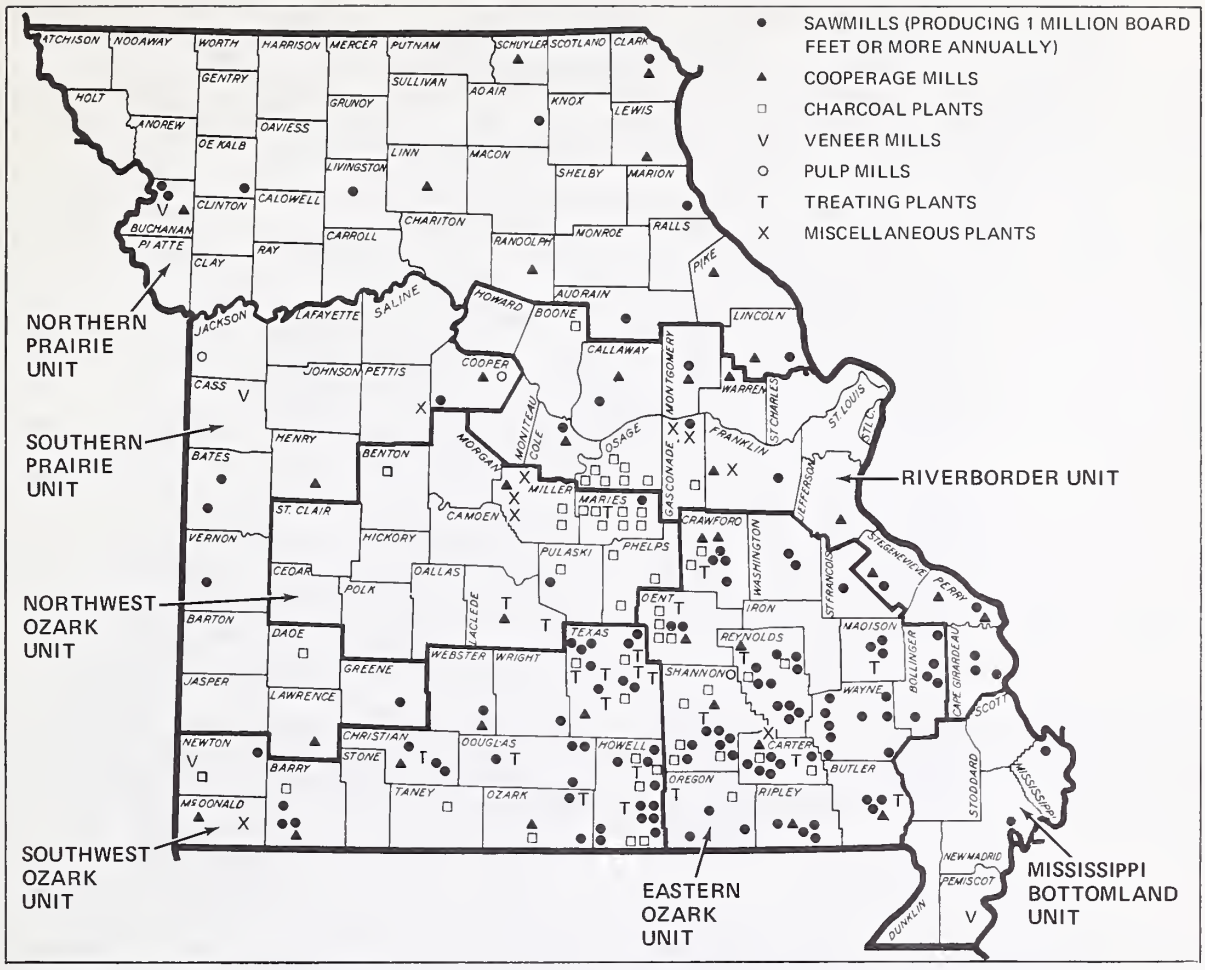

Figure 1. – Primary wood-using plants in Missouri, 1969.

Table 2. – Roundwood production in Missouri, 1969

Product	Standard unit	Thousand standard units: All species	Thousand standard units: Soft-woods	Thousand standard units: Hard-woods	Thousand cubic feet: All species	Thousand cubic feet: Soft-woods	Thousand cubic feet: Hard-woods
Saw logs	Board feet 1/	379,430	18,478	360,952	66,321	3,308	63,013
Cooperage logs	Board feet 1/	53,675	--	53,675	8,845	--	8,845
Veneer logs	Board feet 1/	4,626	--	4,626	1,014	--	1,014
Pulpwood	Standard cords	24	--	24	1,892	--	1,892
Charcoal wood	Standard cords	239	--	239	16,643	--	16,643
Posts	Pieces	4,067	1,519	2,548	2,500	1,152	1,348
Fuelwood	Standard cords	379	2	377	24,453	102	24,351
Poles	Pieces	90	89	1	267	265	2
Mine timbers	Cubic feet	139	--	139	128	--	128
Handle bolts	Board feet 1/	2,543	--	2,543	402	--	402
Miscellaneous 2/	Cubic feet	1,081	338	743	1,081	338	743
Total	Cubic feet	--	--	--	123,546	5,165	118,381

1/ International 1/4-inch rule.
2/ Includes shaving bolts and heading bolts.

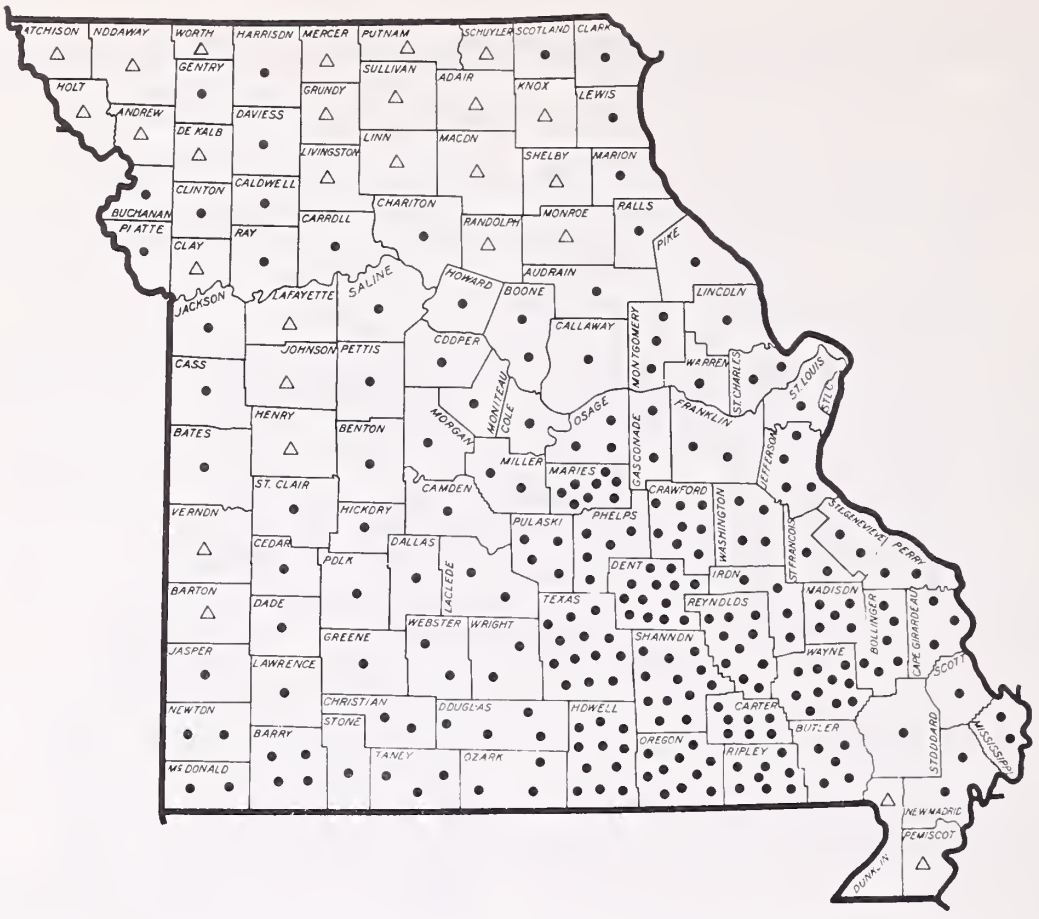

Figure 2. — Output of roundwood products in Missouri counties, 1969. Each dot represents 0.5 million cubic feet. Counties producing less than 0.25 million cubic feet contain a triangle.

Table 3. — Timber products output by product, type of material, and species class in Missouri, 1946, 1958, and 1969
(Million cubic feet)

Product	From roundwood						From plant byproducts					
	Softwoods			Hardwoods			Softwoods			Hardwoods		
	1946	1958	1969	1946	1958	1969	1946	1958	1969	1946	1958	1969
Saw logs	8.3	4.1	3.3	71.1	43.7	63.0	--	--	--	--	--	--
Cooperage logs	--	--	--	14.9	4.5	8.9	--	--	--	--	--	--
Veneer logs	--	--	--	1.4	1.0	1.0	--	--	--	--	--	--
Pulpwood	.1	.1	--	.5	.7	1.9	--	*	--	--	.1	4.4
Charcoal wood	--	--	--	.6	3.2	16.7	--	--	.1	--	--	3.2
Posts	3.2	.8	1.2	7.8	8.8	1.3	--	--	--	--	--	--
Fuelwood	.2	.2	.1	59.2	61.7	24.4	1.4	.7	*	22.3	11.5	2.7
Poles	*	.2	.3	--	--	*	--	--	--	--	--	--
Mine timbers	*	*	--	3.4	.5	.1	--	--	--	--	--	--
Handle bolts	--	--	--	1.3	1.2	.4	--	--	--	--	--	--
Miscellaneous 1/	*	*	.3	2.2	5.7	.7	--	--	.1	--	--	2.0
Total	11.8	5.4	5.2	162.4	131.0	118.4	1.4	.7	.2	22.3	11.6	12.3

*Less than 50 thousand cubic feet.

1/ Includes hewn ties, excelsior bolts, mulch, soil conditioners, shaving wood, heading bolts, etc.

Table 4. – Timber products output from roundwood by product and species in Missouri, 1969

Species	Saw logs	Cooperage logs	Veneer logs	Handle bolts	Pulpwood	Charcoal wood	Poles	Mine timbers	Other products	All products
	M bd. ft.[1]	M bd. ft.[1]	M bd. ft.[1]	M bd. ft.[1]	Cords[2]	Cords[2]	Pieces	M cu. ft.	M cu. ft.[3]	M cu. ft.
Shortleaf pine	15,235	--	--	--	--	--	89,500	--	1,113	4,023
Cypress	187	--	--	--	--	--	--	--	2	35
Eastern redcedar	2,567	--	--	--	--	--	--	--	464	1,009
Other softwoods	489	--	--	--	--	--	--	--	13	98
White oak	66,265	52,389	45	--	2,719	78,137	100	110	17,420	43,662
Red oak	68,345	--	24	--	1,715	18,358	300	7	1,487	15,083
Black oak	116,507	--	--	8	567	109,771	300	6	3,074	31,584
Hickory	15,060	--	1,013	2,229	1,042	28,476	--	3	1,139	6,352
Hard maple	1,670	--	--	--	--	91	--	--	--	276
Soft maple	15,888	57	26	28	3,867	20	--	--	267	3,104
Beech	273	--	--	18	--	--	--	--	--	49
Sweetgum	3,306	672	34	35	--	--	--	--	--	651
Blackgum	2,750	--	--	22	--	302	--	--	--	450
Ash	3,549	57	--	93	220	1,133	--	2	256	960
Cottonwood	24,557	57	488	--	11,104	--	--	--	362	5,134
Basswood	309	--	8	--	--	--	--	--	--	43
Yellow-poplar	958	--	20	--	--	--	--	--	--	154
Black walnut	12,593	--	2,836	--	--	49	--	--	--	3,375
Black cherry	146	--	--	--	--	195	--	--	--	32
Elm	6,123	229	3	77	1,827	1,400	--	--	1,172	2,428
Birch	484	57	--	--	356	--	--	--	2	99
Sycamore	20,190	157	129	21	408	661	--	--	177	3,506
Other hardwoods	1,979	--	--	12	656	--	--	--	1,086	1,439
All species	379,430	53,675	4,626	2,543	24,481	238,593	90,200	128	28,034	123,546

1/ International 1/4-inch rule.
2/ Standard cords, rough wood basis.
3/ Includes posts, fuelwood, shaving bolts, heading bolts, etc.

Average lumber production per mill has been increasing because of newer, more efficient equipment or better mill layout. In addition, most new mills are designed to saw over a million board feet a year, considerably above the average.

Missouri sawmills procured 390 million board feet of logs in 1969, 95 percent from within the State and the remainder from adjacent States and Indiana (table 7). The major imported species from these States were walnut, black oak, soft maple, red oak, and cottonwood. Almost two-thirds of the log receipts from all sources were oak.

During 1969 Missouri loggers harvested 379 million board feet of saw logs, a gain of 21 percent over 1958. Principal cutting shifts included a decline for white oak and shortleaf pine saw logs and gains for red and black oak, soft maple, sycamore, and hickory (table 8). Half of the 1969 saw logs came from the Eastern Ozark Region where each county except one contributed between 5 and 24 million board feet of logs.

One of the fastest growing uses for lumber sawn in Missouri is in pallets (fig. 5). Other important uses of native lumber are for furniture, flooring, boxes and crating, and railroad ties. Specialty high-value uses are in walnut gunstocks and cedar and walnut novelties. Most of this lumber is consumed in the State.

Annual lumber and saw log production in Missouri are likely to continue their moderate advance during the next decade. Furniture and pallet markets will probably expand, and railroad tie markets should remain good. Markets for wooden boxes are apt to be further eroded by substitutes.

COOPERAGE INDUSTRY

Missouri produces one-fourth of the Nation's cooperage logs and bolts, far surpassing any other State. About 54 million board feet were cut in 1969, of which 98 percent was white oak. Two-fifths of this volume came from the Riverborder Region and over one-fourth was from the Eastern Ozarks. All but 3 percent was used at the 36 Missouri cooperage mills. These mills received 57 million board feet of logs in 1969 – 52 million from Missouri, 3 million from Illinois, and 2 million from Iowa. Nine mills in the Riverborder Region consumed over half this volume.

Cooperage mills are more widely dispersed than most other primary wood-using mills. Many are in the Ozarks, but eight are in the lightly forested Northern Prairie Region.

Cooperage log output fell 70 percent between 1946 and 1958. Marginal mills dropped out of production during this period as competition for high quality white oak and labor increased. Eighty-five mills made staves in 1946 compared with 36 in 1958. From 1958 to 1969 the mill population stabilized, but cooperage log production and use nearly doubled as production per mill rose.

Table 5. – Forest products harvested by ownership class, product, and Unit in Missouri, 1969

Ownership class	Saw logs	Cooperage logs	Veneer logs	Pulpwood	Charcoal wood	Posts	Fuelwood	Poles	Mine timbers	Handle bolts	Miscellaneous
	M bd. ft.[1]	M bd. ft.[1]	M bd. ft.[1]	Cords[2]	Cords[2]	M pieces	Cords[2]	Pieces	M cu. ft.	M bd. ft.[1]	M cu. ft.
Federal:											
National Forest:											
Softwoods	5,162	--	--	--	--	486	--	650	--	--	--
Hardwoods	33,813	107	35	--	2,738	1	6,751	--	--	--	--
U.S. Army:											
Softwoods	--	--	--	--	--	--	--	--	--	--	--
Hardwoods	475	--	--	--	--	--	--	--	--	--	--
Corps of Engineers:											
Softwoods	--	--	--	--	--	4	--	--	--	--	--
Hardwoods	138	4	--	--	--	--	--	--	--	--	--
State:											
Softwoods	126	--	--	--	--	25	--	--	--	--	--
Hardwoods	1,681	112	--	--	591	--	8	--	--	100	--
Private:											
Industrial:											
Softwoods	585	--	--	--	--	--	--	--	--	--	--
Hardwoods	12,024	1,011	14	--	15,691	--	--	--	--	--	--
Farm and other:											
Softwoods	12,155	--	--	--	--	1,004	1,600	88,850	--	--	338
Hardwoods	312,821	52,441	4,577	24,481	219,573	2,547	370,641	700	128	2,443	743
All owners:											
Softwoods	18,478	--	--	--	--	1,519	1,600	89,500	--	--	338
Hardwoods	360,952	53,675	4,626	24,481	238,593	2,548	377,400	700	128	2,543	743
EASTERN OZARK UNIT											
Federal:											
National Forest:											
Softwoods	5,079	--	--	--	--	411	--	400	--	--	--
Hardwoods	20,982	16	11	--	1,852	--	5,210	--	--	--	--
Corps of Engineers:											
Hardwoods	14	4	--	--	--	--	--	--	--	--	--
State:											
Softwoods	126	--	--	--	--	14	--	--	--	--	--
Hardwoods	1,457	69	--	--	481	--	8	--	--	100	--
Private:											
Industrial:											
Softwoods	228	--	--	--	--	--	--	--	--	--	--
Hardwoods	9,721	135	--	--	15,670	--	--	--	--	--	--
Farm and other:											
Softwoods	5,754	--	--		--	407	179	42,800	--	--	--
Hardwoods	148,005	14,350	103		94,799	624	84,003	--	73	1,821	72
All owners:											
Softwoods	11,187	--	--	--	--	832	179	43,200	--	--	--
Hardwoods	180,179	14,574	114	--	112,802	624	89,221	--	73	1,921	72
SOUTHWESTERN OZARK UNIT											
Federal:											
National Forest:											
Softwoods	536	--	--	--	--	75	--	50	--	--	--
Hardwoods	10,857	91	--	--	679	--	1,501	--	--	--	--
Corps of Engineers:											
Softwoods	--	--	--	--	--	4	--	--	--	--	--
State:											
Softwoods	--	--	--	--	--	2	--	--	--	--	--
Hardwoods	--	--	--	--	46	--	--	--	--	--	--
Private:											
Industrial:											
Softwoods	357	--	--	--	--	--	--	--	--	--	--
Hardwoods	2,289	12	--	--	11	--	--	--	--	--	--
Farm and other:											
Softwoods	4,756	--	--		--	576	503	46,050	--	--	--
Hardwoods	54,641	3,517	--		42,006	1,001	82,496	700	--	--	80
All owners:											
Softwoods	5,649	--	--	--	--	657	503	46,100	--	--	--
Hardwoods	67,787	3,620	--	--	42,742	1,001	83,997	700	--	--	80
NORTHWESTERN OZARK UNIT											
Federal:											
National Forest:											
Softwoods	16	--	--	--	--	--	--	200	--	--	--
Hardwoods	2,506	--	24	--	1,248	1	40	--	--	--	--
U.S. Army:											
Hardwoods	475	--	--	--	--	--	--	--	--	--	--
Corps of Engineers:											
Hardwoods	95	--	--	--	--	--	--	--	--	--	--
State:											
Softwoods	--	--	--	--	--	1	--	--	--	--	--
Hardwoods	--	--	--	--	24	--	--	--	--	--	--
Private:											
Industrial:											
Hardwoods	12	--	--	--	10	--	--	--	--	--	--
Farm and other:											
Softwoods	786	--	--	--	--	3	134	--	--	--	338
Hardwoods	17,527	4,518	198	--	57,676	394	71,426	--	10	--	166
All owners:											
Softwoods	802	--	--	--	--	4	134	200	--	--	338
Hardwoods	20,615	4,518	222	--	58,958	395	71,466	--	10	--	166

(Continued on next page)

Table 5 continued

Ownership class	Saw logs	Cooperage logs	Veneer logs	Pulp-wood	Charcoal wood	Posts	Fuel-wood	Poles	Mine timbers	Handle bolts	Miscellaneous
	M bd. ft.[1]	M bd. ft.[1]	M bd. ft.[1]	Cords[2]	Cords[2]	M pieces	Cords[2]	Pieces	M cu. ft.	M bd. ft.[1]	M cu. ft.
SOUTHERN PRAIRIE UNIT											
Federal:											
Corps of Engineers:											
Hardwoods	29	--	--	--	--	--	--	--	--	--	--
Private:											
Industrial:											
Hardwoods	2	864	14	--	--	--	--	--	--	--	--
Farm and other:											
Softwoods	11		--	--	--	--	--	--	--	--	--
Hardwoods	13,160	601	552	5,677	1,378	129	32,800	--	--	--	361
All owners:											
Softwoods	11	--	--	--	--	--	--	--	--	--	--
Hardwoods	13,191	1,465	566	5,677	1,378	129	32,800	--	--	--	361
NORTHERN PRAIRIE UNIT											
Private:											
Farm and other:											
Hardwoods	28,124	7,740	2,204	13,688	200	212	30,600	--	--	--	--
All owners:											
Hardwoods	28,124	7,740	2,204	13,688	200	212	30,600	--	--	--	--
RIVER BORDER UNIT											
Federal:											
National Forest:											
Softwoods	4	--	--	--	--	--	--	--	--	--	--
Hardwoods	89	--	--	--	--	--	--	--	--	--	--
State:											
Softwoods	--	--	--	--	--	8	--	--	--	--	--
Hardwoods	224	43	--	--	40	--	--	--	--	--	--
Private:											
Farm and other:											
Softwoods	659	--	--	--	--	15	784	--	--	--	--
Hardwoods	36,586	21,525	948	3,401	22,473	184	59,016	--	36	457	63
All owners:											
Softwoods	663	--	--	--	--	23	784	--	--	--	--
Hardwoods	36,899	21,568	948	3,401	22,513	184	59,016	--	36	457	63
MISSISSIPPI BOTTOMLAND UNIT											
Private:											
Farm and other:											
Softwoods	166	--	--	--	--	3	--	--	--	--	--
Hardwoods	14,157	190	572	1,715	--	3	10,300	--	9	165	1
All owners:											
Softwoods	166	--	--	--	--	3	--	--	--	--	--
Hardwoods	14,157	190	572	1,715	--	3	10,300	--	9	165	1

1/ International 1/4-inch rule.
2/ Standard cords, rough wood basis.

The outlook for this industry is uncertain. Since 1969 cooperage log production has fallen and several mills have closed. All companies, except one, in Missouri are making staves for whiskey barrels. By law, all bourbon whiskey must be aged in new, white oak barrels. Recently the distillers began producing a new product called "light" whiskey that can be aged in used cooperage. Because of the partial change to light whiskeys and the uncertainty of bourbon markets in the future, demand for new barrels has plummeted. There are 3 million or more barrels of light whiskey being aged, the first of which was marketed in 1972. The popularity of light whiskey will help determine the future of the cooperage industry. On the other hand, many Europeans are just becoming acquainted with bourbon. If it suits their taste, bourbon exports would be a boon to the cooperage manufacturer.

During the first 9 months of 1971, U.S. bourbon exports reached 2.6 million proof gallons (more than one-third to West Germany), a gain of 65 percent over the same period 2 years earlier.

CHARCOAL INDUSTRY

Missouri is also the leading charcoal producing State. Annual production is about 125,000 tons as compared to 500,000 tons nationwide (fig. 6). This industry is especially important because it provides an outlet for low-grade hardwoods that have no other market.

A fledgling Missouri industry of three firms in 1946, it grew to 60 plants in 1958, using about five times as much wood. From 1958 to 1969 the annual wood requirements expanded sixfold.

Table 6. – Lumber production by Unit, county,[1] and softwoods and hardwoods in Missouri, 1969
(Thousand board feet)

Unit and county	Soft-woods	Hard-woods	Total	Unit and county	Soft-woods	Hard-woods	Total
Eastern Ozarks:	9,695	167,695	177,390	Northwest Ozarks:	715	11,822	12,537
Bollinger	287	12,848	13,135	Dallas	--	855	855
Butler	989	9,694	10,683	Maries	--	3,659	3,659
Carter	1,040	11,715	12,755	Phelps	--	1,605	1,605
Crawford	10	8,850	8,860	Laclede & Pulaski	--	3,994	3,994
Dent	60	6,873	6,933	All others	715	1,709	2,424
Iron	318	5,946	6,264				
Madison	1,576	10,288	11,864	Southern Prairie:			
Oregon	140	12,006	12,146	All counties	--	12,652	12,652
Reynolds	1,211	22,331	23,542				
Ripley	335	13,641	13,976	Northern Prairie:			
Shannon	1,404	15,027	16,431	All counties	--	25,777	25,777
Wayne	1,005	24,208	25,213				
St. Francis & Washington	1,320	14,268	15,588	River Border:	694	45,548	46,242
				Cape Girardeau	--	6,790	6,790
				Cole, Franklin, & Perry	283	26,971	27,254
Southwest Ozarks:	6,111	77,266	83,377	Callaway, Gasconade, Montgomery & Ste. Genevieve	335	8,390	8,725
Barry	144	7,676	7,820	Howard, St. Charles, & St. Louis	--	3,039	3,039
Christian	--	4,757	4,757	All others	76	358	434
Douglas	795	6,548	7,343				
Howell	795	22,534	23,329				
McDonald	--	1,271	1,271				
Newton	--	2,287	2,287	Mississippi Bottomlands:			
Ozark	375	5,555	5,930	All counties	110	9,850	9,960
Stone	--	230	230				
Taney	1,424	1,389	2,813				
Texas	2,548	21,609	24,157				
Webster	--	1,490	1,490				
Wright	30	1,920	1,950				
Missouri total					17,325	350,610	367,935

1/ Some counties were combined to avoid individual mill disclosures.

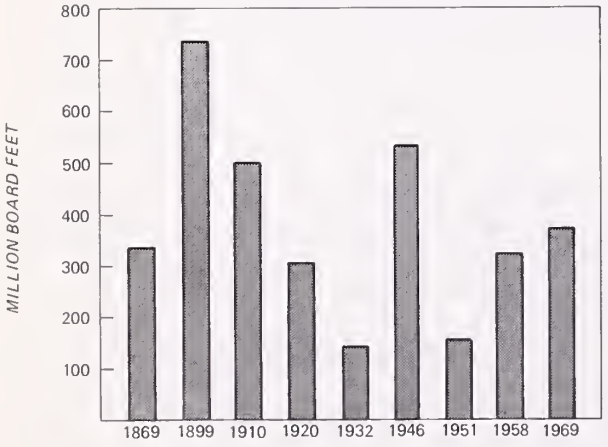

Figure 3. – Lumber production in Missouri for selected years, 1869-1969. (Years selected were those showing peaks or troughs, or general trends toward peaks or troughs.) Sources: Lumber production in the United States 1799-1946. U.S. Dep. Agric. Misc. Public. 669, 1948. Lumber production and mill stocks. U.S. Dep. Com., Bur. Census Annu. Rep. 1951, 1958, and 1969.

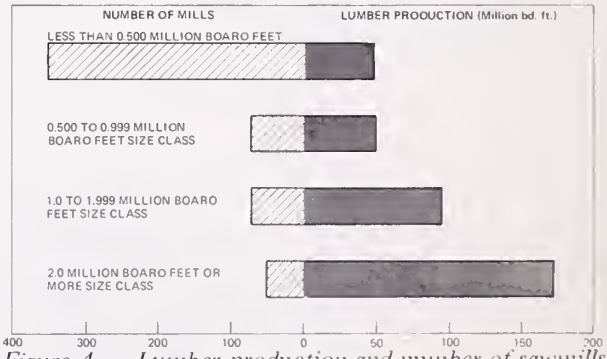

Figure 4. – Lumber production and number of sawmills by annual production size class in Missouri, 1969.

Five Missouri charcoal briquette plants provided a market for the charcoal in 1969. Since then another briquette plant has opened and another has been planned.

Charcoal wood receipts at Missouri's 52 active plants in 1969 totaled 237,000 cords of roundwood: 86 percent oak and 12 percent hickory – the two premier species for charcoal. In addition, about 47,000 cords of

Table 7. – Saw log production, receipts, and movement, Missouri, 1969
(Thousand board feet)[1]

Species	Production									Out-of-State receipts from:						Receipts in Missouri
	Remained in Missouri	Shipped to: Kansas	Illinois	Kentucky	Iowa	Arkansas	Tennessee	Other states	Total	Illinois	Iowa	Arkansas	Kansas	Indiana	Oklahoma	
Shortleaf pine	15,235	--	--	--	--	--	--	--	15,235	--	--	3	--	--	--	15,238
Cypress	175	--	12	--	--	--	--	--	187	--	--	--	--	--	--	175
Eastern redcedar	2,567	--	--	--	--	--	--	--	2,567	--	--	338	--	--	--	2,905
Other softwoods	448	--	--	41	--	--	--	--	489	--	--	--	--	--	--	448
White oak	65,811	--	--	143	125	180	3	3	66,265	265	18	727	11	--	--	66,832
Red oak	67,578	--	--	428	194	133	12	--	68,345	2,045	5	248	327	--	--	70,203
Black oak	116,240	--	15	106	6	140	--	--	116,507	2,677	3	1,161	27	--	--	120,108
Hickory	14,667	67	32	175	28	83	--	8	15,060	169	--	164	13	--	--	15,013
Hard maple	1,452	206	--	--	12	--	--	--	1,670	80	--	--	--	--	--	1,532
Soft maple	15,327	--	--	123	435	--	3	--	15,888	1,249	1,549	30	25	320	--	18,500
Beech	273	--	--	--	--	--	--	--	273	267	--	--	--	--	--	540
Sweetgum	2,779	--	135	266	--	66	60	--	3,306	258	--	--	--	--	--	3,037
Blackgum	2,629	--	24	37	--	--	60	--	2,750	86	--	--	--	--	--	2,715
Ash	3,463	67	--	--	19	--	--	--	3,549	242	48	6	37	19	--	3,815
Cottonwood	22,788	--	1,375	215	131	--	48	--	24,557	1,356	606	--	214	--	--	24,964
Basswood	288	--	--	--	21	--	--	--	309	--	--	--	--	--	--	288
Yellow-poplar	936	--	--	--	--	--	3	19	958	493	--	--	--	--	--	1,429
Black walnut	9,501	2,847	--	--	31	--	--	214	12,593	155	1,490	487	1,411	395	171	13,610
Black cherry	146	--	--	--	--	--	--	--	146	68	--	--	--	--	--	214
Elm	5,923	68	--	--	93	27	12	--	6,123	73	3	10	46	--	51	6,106
Birch	445	--	--	--	39	--	--	--	484	21	8	--	5	--	--	479
Sycamore	19,860	59	79	106	31	27	28	--	20,190	483	--	10	50	--	--	20,403
Other hardwoods	1,714	209	--	--	24	27	5	--	1,979	31	29	--	12	13	--	1,799
All species	370,245	3,523	1,672	1,640	1,189	683	234	244	379,430	10,018	3,759	3,184	2,178	747	222	390,353

1/ International 1/4-inch rule.

Table 8. – Saw log harvest changes in Missouri, 1958 and 1969
(Million board feet)

Species	Size of harvest 1958	Size of harvest 1969	Change
Shortleaf pine	24.4	15.2	- 9.2
Cypress	1.3	.2	- 1.1
Redcedar	1.2	2.6	+ 1.4
Other softwoods	--	.5	+ .5
White oak	120.6	66.2	-54.4
Red oak	41.8	68.3	+26.5
Black oak	68.6	116.5	+47.9
Hickory	4.7	15.1	+10.4
Hard maple	1.2	1.7	+ .5
Soft maple	1.9	15.9	+14.0
Sweetgum	1.7	3.3	+ 1.6
Blackgum	2.1	2.7	+ .6
Ash	.5	3.5	+ 3.0
Cottonwood	16.3	24.6	+ 8.3
Yellow-poplar	2.7	1.0	- 1.7
Black walnut	8.7	12.6	+ 3.9
Elm	7.7	6.1	- 1.6
Birch	--	.5	.5
Sycamore	7.8	20.2	+12.4
Other hardwoods	.9	2.7	+ 1.8
Total	314.1	379.4	+65.3

plant residue were received at these plants. Essentially all of the charcoal wood used in Missouri originates in the State.

Loggers cut 238,600 cords of charcoal wood in 1969 in Missouri, shipped less than 1 percent to Arkansas, and delivered the remainder to Missouri plants.

Charcoal production in Missouri should continue to increase but at a slower rate than in the last decade. Any change in the desire for charcoal-broiled food, of course, will have an important effect on charcoal production.

PULPMILL INDUSTRY

Missouri is becoming a more important pulpwood producer. From 1,200 roundwood cords in 1955, production climbed to 81,000 cords in 1969 – two-thirds was plant byproducts,[5] the rest was roundwood.

Round pulpwood output has remained steady since 1964, but the use of Missouri plant byproducts in pulping has been rising. Plant byproducts from Missouri were first used for pulp in 1965, and their use has grown rapidly. Most of these byproducts are shipped to Illinois.

Two pulpmills, with a total capacity of 170 groundwood tons per 24 hours, are operating in Missouri. Both mills began production during the last 25 years; they manufacture fiber-board, roof insulation board, and roofing felt.

A bright future is likely for Missouri pulpwood production. It is one of the last States with a large quantity of untapped hardwood timber, some of which is unsuitable for higher value products. Whole tree chipping in the woods could give a boost to the use of oak with its large

[5] *Plant byproducts are slabs, edgings, veneer cores, sawdust, etc., used for products.*

Figure 5. – Missouri pallet manufacturing is a growth industry, but highly competitive because of ease of entry into pallet production. Pallets such as these are designed to reduce labor and handling costs of merchandise in warehouses and in transit in trucks, trains, and ships. (Photo courtesy of Missouri Conservation Department.)

volume of limbwood relative to many other species. As competition for pulpwood increases in other areas, pulp companies will probably turn to Missouri for additional supplies.

Most of the Ozark Region is not served by pulpwood markets, and forest management improvements are being delayed accordingly.

OTHER TIMBER INDUSTRIES

Veneer Logs and Bolts

Veneer log production dwindled from over 7 million board feet in 1958 to 4.6 million in 1969. However, walnut and pecan hickory production rose during this period. These species constituted over four-fifths of the

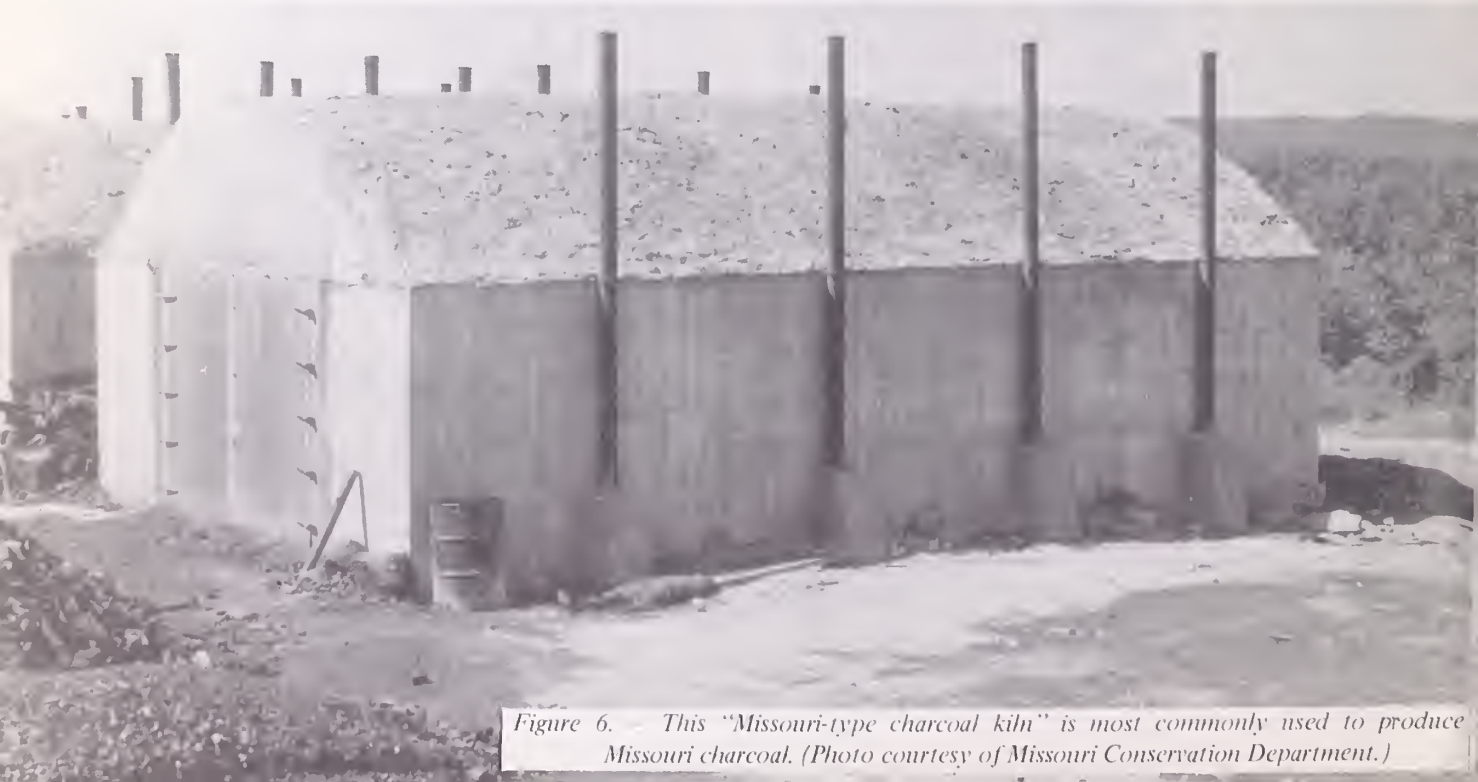

Figure 6. This "Missouri-type charcoal kiln" is most commonly used to produce Missouri charcoal. (Photo courtesy of Missouri Conservation Department.)

1969 veneer log volume cut; in 1958 less than one-fifth was walnut and no hickory was cut. Cottonwood and soft maple were the high-volume container veneer species cut in 1958. During this period markets for Missouri logs shifted from container veneers to face veneers used in furniture, paneling, etc.

Railroads reported 1.2 million board feet of Missouri walnut logs destined for overseas markets in 1969. Shipments were dispersed in all directions because of Missouri's central location and good rail connections to all coasts (including the Great Lakes). Seaports and Great Lakes ports in nine States received Missouri veneer logs, undoubtedly bound mainly for Germany and Japan. Veneer log production may be erratic during the 1970's if other veneer species or nonwood materials are substituted for walnut and pecan veneers in furniture manufacturing, or vice versa. These substitutions will be greatly influenced by changes in consumer tastes and preferences for furniture. Over the near term, furniture markets should rise as family formations increase. This market will provide Missouri loggers a chance to maintain their sales of walnut and pecan logs provided competition from simulated wood grain finishes doesn't become severe.

Posts (Round and Split)

Round and split post production in Missouri was about 4 million pieces in 1969, 75 percent less than in 1958. However, the trend has been toward sawing posts square at several plants as substitutes for round and split posts. An unknown but significant portion of the decline in round posts is undoubtedly due to this substitution of sawn posts.

Miscellaneous

Pole harvesting is rising because more shortleaf pine are becoming pole size. Except for a few hundred oak poles, all round poles in Missouri are pine. Meanwhile, many poles are sawn square on the sides. Perhaps half of the poles manufactured in Missouri are sawn hardwoods.

In 1946 no poles were cut except a few by farmers for their own use. Pole output moved up to 62 thousand round poles by 1958 and to 90 thousand in 1969. Nearly all of these poles and 2.8 million Missouri posts were treated in 1969 at 22 Missouri wood-preserving plants (fig. 7). By 1972, 27 treating plants were operating, and more are expected to start up by 1975.

Figure 7. – These Missouri posts are being loaded into cylinders for pressure preservative treatment. The preservative will give added years of usefulness to the posts. (Photo courtesy of Missouri Conservation Department.)

Mine timber use in 1969 was 128 thousand cubic feet, only one-fifth the volume used in 1958. Mine timber use per ton of coal or ore mined has been dropping and some mines have closed. Coal-mining companies need most of the timbers, and white oak is the favorite species. Small quantities of timbers are needed in iron and lead-zinc mines.

Handle bolt output shrank in 1969 to about one-third of the 1958 production. Hickory, used for striking tools such as axes, hammers, and railroad picks, is the preferred species.

Other minor products currently harvested are shaving bolts and heading bolts. Shavings are used for pet bedding and by meat processors in curing and smoking operations; heading bolts are used for manufacturing barrel headings. Miscellaneous plant byproducts uses include soil conditioners, mulch, and animal bedding.

PRIMARY PLANT RESIDUE

Sixty percent (18.8 million cubic feet) of the 1969 Missouri primary plant residue was not used (table 9). Of the unused portion, 7.9 million cubic feet (or 100,000 cords) was coarse residue suitable for chipping. Nearly half of the unused volume was in the Eastern Ozark Region, including 4.1 million of coarse residue; more than one-fifth was in the Southwest Ozark Region.

Companies requiring more pulpwood or charcoal wood should consider the large quantity of coarse plant residue available at sawmills in these two regions as a potential supply source. This supply included 52,500 cords in the Eastern Ozarks and 23,500 cords in the Southwest Ozarks.

Farmers, nurseries, and companies supplying farmers, nurseries, gardeners, and landscapers should consider using the 9.4 million cubic feet of unused fine residue (primarily sawdust and shavings) in the Eastern and Southwest Ozarks and the Riverborder Region. Such material is useful for livestock and pet bedding, mulch, soil conditioners, and poultry litter.

Table 9. – Volume of primary plant residue by kind of material, type of use, and Unit of origin in Missouri, 1969
(Thousand cubic feet)

ALL UNITS

Source industry and kind of residue	Volume by type of use								
	Fiber[1]		Charcoal		Fuel[2]		Other[3]		Not used[4]
	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods
Lumber:									
Coarse	3,252	99	2,944	25	1,355	59	18	548	6,922
Fine	250	--	--	3	406	78	1,264	426	8,112
Total	3,502	99	2,944	28	1,761	137	1,282	974	15,034
All other:									
Coarse	726	--	183	--	758	--	57	--	463
Fine	206	--	42	--	201	--	706	--	2,348
Total	932	--	225	--	959	--	763	--	2,811
All industries:									
Coarse	3,978	99	3,127	25	2,113	59	75	548	7,385
Fine	456	--	42	3	607	78	1,970	426	10,460
Total	4,434	99	3,169	28	2,720	137	2,045	974	17,845
EASTERN OZARK UNIT									
Lumber:									
Coarse	971	44	1,532	6	392	1	5	323	3,755
Fine	86	--	--	1	13	3	97	273	4,404
Total	1,057	44	1,532	7	405	4	102	596	8,159
All other:									
Coarse	63	--	120	--	144	--	--	--	70
Fine	--	--	42	--	83	--	18	--	445
Total	63	--	162	--	227	--	18	--	515
All industries:									
Coarse	1,034	44	1,652	6	536	1	5	323	3,825
Fine	86	--	42	1	96	3	115	273	4,849
Total	1,120	44	1,694	7	632	4	120	596	8,674
SOUTHWEST OZARK UNIT									
Lumber:									
Coarse	158	54	1,147	17	427	26	--	208	1,605
Fine	--	--	--	--	99	32	247	147	1,957
Total	158	54	1,147	17	526	58	247	355	3,562
All other:									
Coarse	--	--	42	--	54	--	--	--	40
Fine	--	--	--	--	--	--	76	--	144
Total	--	--	42	--	54	--	76	--	184
All industries:									
Coarse	158	54	1,189	17	481	26	--	208	1,645
Fine	--	--	--	--	99	32	323	147	2,101
Total	158	54	1,189	17	580	58	323	355	3,746

See footnotes on page 15

Table continued on next page

Table 9 continued

Species	Volume by type of use								
	Fiber[1]		Charcoal		Fuel[2]		Other[3]		Not used[4]
	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods
NORTHWEST OZARK UNIT									
Lumber:									
Coarse	22	--	246	--	141	30	--	3	73
Fine	--	--	--	--	13	18	84	2	235
Total	22	--	246	--	154	48	84	5	308
All other:									
Coarse	79	--	--	--	4	--	--	--	--
Fine	--	--	--	--	33	--	33	--	72
Total	79	--	--	--	37	--	33	--	72
All industries:									
Coarse	101	--	246	--	145	30	--	3	73
Fine	--	--	--	--	46	18	117	2	307
Total	101	--	246	--	191	48	117	5	380
SOUTHERN PRAIRIE UNIT									
Lumber:									
Coarse	--	--	13	--	62	--	3	1	427
Fine	--	--	--	--	12	--	176	--	161
Total	--	--	13	--	74	--	179	1	588
All other:									
Coarse	--	--	--	--	5	--	3	--	73
Fine	--	--	--	--	2	--	38	--	90
Total	--	--	--	--	7	--	41	--	163
All industries:									
Coarse	--	--	13	--	67	--	6	1	500
Fine	--	--	--	--	14	--	214	--	251
Total	--	--	13	--	81	--	220	1	751
NORTHERN PRAIRIE UNIT									
Lumber:									
Coarse	604	--	--	--	68	--	--	--	518
Fine	164	--	--	--	2	--	185	--	474
Total	768	--	--	--	70	--	185	--	992
All other:									
Coarse	105	--	--	--	36	--	54	--	183
Fine	--	--	--	--	74	--	159	--	385
Total	105	--	--	--	110	--	213	--	568
All industries:									
Coarse	709	--	--	--	104	--	54	--	701
Fine	164	--	--	--	76	--	344	--	859
Total	873	--	--	--	180	--	398	--	1,560

See footnotes on page 15

Table continued on next page

Table 9 continued

Species	Volume by type of use								
	Fiber[1]	Charcoal		Fuel[2]		Other[3]		Not used[4]	
	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods
RIVER BORDER UNIT									
Lumber:									
Coarse	1,332	1	6	2	59	2	10	13	513
Fine	--	--	--	2	95	25	475	1	773
Total	1,332	1	6	4	154	27	485	14	1,286
All other:									
Coarse	350	--	21	--	504	--	--	--	97
Fine	--	--	--	--	--	--	382	--	1,212
Total	350	--	21	--	504	--	382	--	1,309
All industries:									
Coarse	1,682	1	27	2	563	2	10	13	610
Fine	--	--	--	2	95	25	857	1	1,985
Total	1,682	1	27	4	658	27	867	14	2,595
MISSISSIPPI BOTTOMLANDS UNIT									
Lumber:									
Coarse	165	--	--	--	206	--	--	--	31
Fine	--	--	--	--	172	--	--	3	108
Total	165	--	--	--	378	--	--	3	139
All other:									
Coarse	129	--	--	--	11	--	--	--	--
Fine	206	--	--	--	9	--	--	--	--
Total	335	--	--	--	20	--	--	--	--
All industries:									
Coarse	294	--	--	--	217	--	--	--	31
Fine	206	--	--	--	181	--	--	3	108
Total	500	--	--	--	398	--	--	3	139

1/ For manufacture of pulp, hardboard, or roofing felt.
2/ All residue used for industrial or domestic fuel whether sold or given away.
3/ Includes uses such as livestock bedding, mulch, small dimension, and specialty items.
4/ Includes residue burned as waste.

Detailed supplementary county tables of 1969 Missouri timber products output are available without charge on request. These tables show separately the quantity of saw logs, veneer logs, cooperage logs, charcoal wood, and all other products harvested in 1969, by species and county. The tables may be useful to readers wishing to analyze timber harvests for various species in different county groupings. Address your request to:

Information Services
North Central Forest Experiment Station
Folwell Avenue
St. Paul, Minnesota 55101

☆U.S. Government Printing Office: 1973 — 761-327

Blyth, James E. and Robert Massengale.
1972. Missouri's primary forest products output and industries, 1969. North Cent. For. Exp. Stn., St. Paul, Minn. 15 p., illus. (USDA For. Serv. Resour. Bull. NC-16)

Missouri roundwood production was 123.5 million cubic feet in 1969 – 96 percent hardwoods and 4 percent softwoods. Of this total, over half was saw logs, one-eighth was charcoal wood, and 7 percent was cooperage logs. Most logging is centered in and adjacent to the Eastern Ozark Region.

OXFORD: 792:791:796.4(778). KEY WORDS: saw logs, cooperage logs, charcoal wood, pulpwood, residue, markets.

Blyth, James E., and Robert Massengale.
1972. Missouri's primary forest products output and industries, 1969. North Cent. For. Exp. Stn., St. Paul, Minn. 15 p., illus. (USDA For. Serv. Resour. Bull. NC-16)

Missouri roundwood production was 123.5 million cubic feet in 1969 – 96 percent hardwoods and 4 percent softwoods. Of this total, over half was saw logs, one-eighth was charcoal wood, and 7 percent was cooperage logs. Most logging is centered in and adjacent to the Eastern Ozark Region.

OXFORD: 792:791:796.4(778). KEY WORDS: saw logs, cooperage logs, charcoal wood, pulpwood, residue, markets.

OTHER RESOURCE BULLETINS OF THE NORTH CENTRAL FOREST EXPERIMENT STATION

The Growing Timber Resource of Michigan, 1966, by Clarence D. Chase, Ray E. Pfeifer, and John S. Spencer, Jr. USDA For. Serv. Resour. Bull. NC-9, 62 p., illus. 1970.

Veneer-Log Production and Receipts, North Central Region, 1968, by Thomas P. Ginnaty, Jr. USDA For. Serv. Resour. Bull. NC-10, 8 p., illus. 1970.

Pulpwood Production in the North Central Region By County, 1969, by James E. Blyth. USDA For. Serv. Resour. Bull. NC-11, 23 p., illus. 1970.

Primary Forest Products Industry & Industrial Roundwood Production, Michigan, 1969, by James E. Blyth and Allen H. Boelter. USDA For. Serv. Resour. Bull. NC-12, 12 p., illus. 1971.

Pulpwood Production in the North Central Region By County, 1970, by James E. Blyth. USDA For. Serv. Resour. Bull. NC-13, 22 p., illus. 1971.

Veneer-Log Production and Receipts, North Central Region, 1970, by Thomas P. Ginnaty, Jr. USDA For. Serv. Resour. Bull. NC-14, 8 p., illus. 1972.

ABOUT THE FOREST SERVICE . . .

As our Nation grows, people expect and need more from their forests — more wood; more water, fish, and wildlife; more recreation and natural beauty; more special forest products and forage. The Forest Service of the U.S. Department of Agriculture helps to fulfill these expectations and needs through three major activities:

- Conducting forest and range research at over 75 locations ranging from Puerto Rico to Alaska to Hawaii.
- Participating with all State forestry agencies in cooperative programs to protect, improve, and wisely use our Country's 395 million acres of State, local, and private forest lands.
- Managing and protecting the 187-million acre National Forest System.

The Forest Service does this by encouraging use of the new knowledge that research scientists develop; by setting an example in managing, under sustained yield, the National Forests and Grasslands for multiple use purposes; and by cooperating with all States and with private citizens in their efforts to achieve better management, protection, and use of forest resources.

Traditionally, Forest Service people have been active members of the communities and towns in which they live and work. They strive to secure for all, continuous benefits from the Country's forest resources.

For more than 60 years, the Forest Service has been serving the Nation as a leading natural resource conservation agency.